

**Epson C88+
Dilute Eboni
Carbon – 13.5%
("C13-5")**

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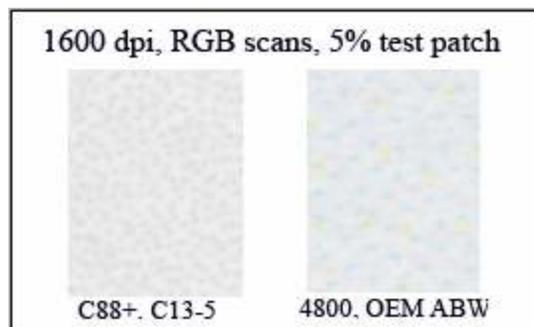
The C88+ is capable of making very good, 100% carbon pigment prints with dilute Eboni matte black. It is significantly smoother than a "Black Only" approach that uses no dilute gray inks. It will be significantly more stable than a blended carbon-color B&W inkset. And it is just as easy as the other C84-C88 "EZ" workflows.

Either Eboni-6 (see <http://www.paulroark.com/BW-Info/Eboni-6.pdf>) or Carbon-6 (see <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>) inks can be used.

The dilution that is used here is 13.5% Eboni ("C13-5"). That is achieved by either, first, combining bottles of Eboni-6 M and LC (1 part Eb6-M to 1 part Eb6-LC) (MIS currently has no pre-mixed Eboni-6 "EZ" ink), or, second, mixing a 13.5% solution of Eboni with the generic base described at <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>

C13-5 prints with a very straight-line ramp or characteristic curve with no adjustments (driver set to No Color Adjustment). One can easily darken or lighten the image simply by making slightly darker or lighter mixes of the ink. This is easy and totally user-controllable.

Partitioned mixes and workflows are possible, but the single 13.5% mix is very smooth, particularly when using one of the ICCs or curves that use only one of the inks in the top highlights. See the comparison of the 5% test strip patch of C13-5 compared to the Epson "Advanced B&W" mode print with a 4800.



As described below, the print tones are from near neutral to warm. They are not as cool as MIS EZ-Neutral (a blended carbon-color inkset) and not as warm as MIS EZ-Warm (which is 100% carbon, using the warm MIS UltraTone inks).

Glossy papers cannot be used without a post-printing spray like Premier Art Print Shield. On glossy papers the tones are warmer than the matte papers. I recommend and use only matte papers with these dilute Eboni mixes.

The C88+ with C13-5 makes for an easy, affordable route to very good and stable 100% carbon pigment prints.

Tones

In general, the tones are from what I'd call "near neutral" to "medium warm." The C88 with C13-5 prints about one Lab B unit warmer than the 220 or 2200 with Eboni-6 or Carbon-6, but in actual photographs the differences are not likely to be noticed by viewers.

The warmth from carbon is best measured by the Lab B maximum, as well as the split-tone differential from the paper white to the B-max. The graph below shows Lab B values for some popular papers that work well with this approach.

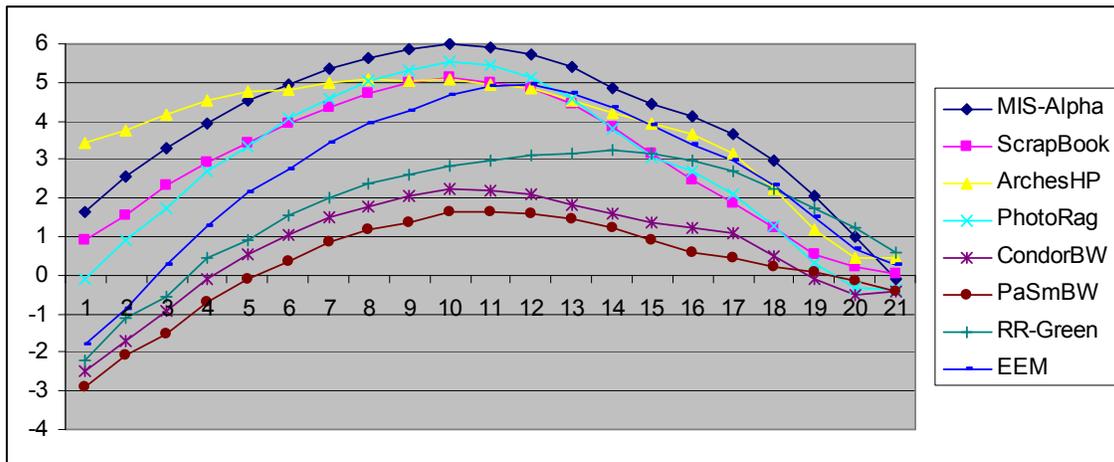
The Lab A measures for all papers are similar, generally between Lab A = 1 and 3. The print Lab A tones generally match the paper white Lab A measure, with an increase of about one unit in the midtones for many papers. Because of the lack of much difference in the Lab A values, they were omitted from the graph below.

The vertical axis on the left of the graph shows the Lab B for the paper. Theoretical neutral would be at Lab B = 0. A positive Lab B is yellow (warm), and a negative Lab B is blue (cool). At the low values here, one does not experience "blue" or "yellow," but rather cool or warm. The un-brightened papers are often described as having a more "creamy" look than the brightened ones.

For reference, the Lab B measure for the "Gallery White" Light Impressions matte board I commonly use is Lab B = 3. As such, the carbon image on the brightened papers I use for landscapes never reaches a Lab B as high as the matte board. The image, thus, appears rather cool, but with a slight feeling of warmth in the midtones due to the increase in Lab B there relative to the cool paper tone.

The horizontal axis in the graph is the relative density of the patch of a 21-Step test strip that was printed with the C88+ and C13-5. The paper white (0% ink) is on the left (patch #1), 50% is at patch #11, and the 100% black is at #21.

Lab B Paper



Paper White21-Step test print patches100% Black

Looking at the paper white measures at the left of the chart, note that all of the papers that contain OBAs have a Lab B < 0 (slightly blue or cool). All of the “natural” papers with no OBAs have Lab B > 0 (slightly yellow or warm), with Arches Hot Press (un-coated) being the warmest at over 3. Note also that we can barely see a difference of one Lab B difference, and all of these papers would be considered “white.” In short, all of these differences are subtle when not viewed side-by-side and the focus of attention.

All of the listed papers are acid free except “EEM” (now called Ultra Premium Presentation Matte).

Premier Art’s Smooth BW 200 or Hawk Mountain Condor BW is what I most often use when I want a relatively neutral, bright paper. Moab Entrada BW is similar. With all of these papers the warmest tone in the print has a lower (cooler) Lab B that the “Gallery White” mat board. On the other hand, the medium split tone does give some feeling of warmth to the midtones.

The warmest paper I regularly use is MIS (or PermaJet) Alpha (Innova Soft Texture, non-OBA coating). This has a maximum Lab B = 6. For comparison, sepia prints can have a Lab B of 25. Matted, the Alpha prints are what most would think of as medium warm.

Concentrated Eboni ink prints more neutrally than do the dilutions of it. Some don’t mind the roughness of the C88 in a “Black Ink Only” mode, which is supported by the C88 Epson driver and available with this approach. However, it is significantly rougher. I do not consider “Black Only” mode to be photo quality.

Note that curled paper can cause head strike with this printer. The C88, like some other entry-level printers, uses the head in a “vertical” orientation, like the paper. As such, it is still printing about one inch beyond the first and main set of paper transport rollers. Ideally, the paper margin, particularly at the bottom of the image, should be about an inch, allowing the printer to be using both sets of rollers while printing even the very edge of the image. If an 8x10 image is centered on a letter size paper that has a concave curl, the edge of the paper (usually the bottom right corner) can curl up after it is no longer held down by the main set of rollers. This can cause the head to hit the edge of the paper.

To remedy this situation, I use a paper towel roll central cardboard core to take the curl out of the paper. With a small stack of plain paper over the coated concave paper surface to protect it, I roll the paper stack around the paper towel core with the coated side out, thus putting a reverse curl on the paper. The bottom corners of the paper can also be gently rolled back.

Printing Procedure or Workflow

I recommend printing with the Epson driver and with an ICC made with QTR’s Create ICC-RGB program.

(See <http://www.quadtonerip.com/html/QTRoverview.html> to download QTR. While QTR is not needed to print with ICCs, it is needed to make new ones. It’s a tool I recommend all serious printers learn to use.)

I have posted ICC profiles for a number of papers, as well as some useful or representative curves, and test files. To download these, click here: <http://www.paulroark.com/BW-Info/C88-Carbon-Profiles.zip>

The ICCs are placed in the following locations with different OS’s:

Windows XP -- c:\windows\system32\spool\drivers\color\

Mac OS 9.x: -- Systems Folder/ColorSync Profiles

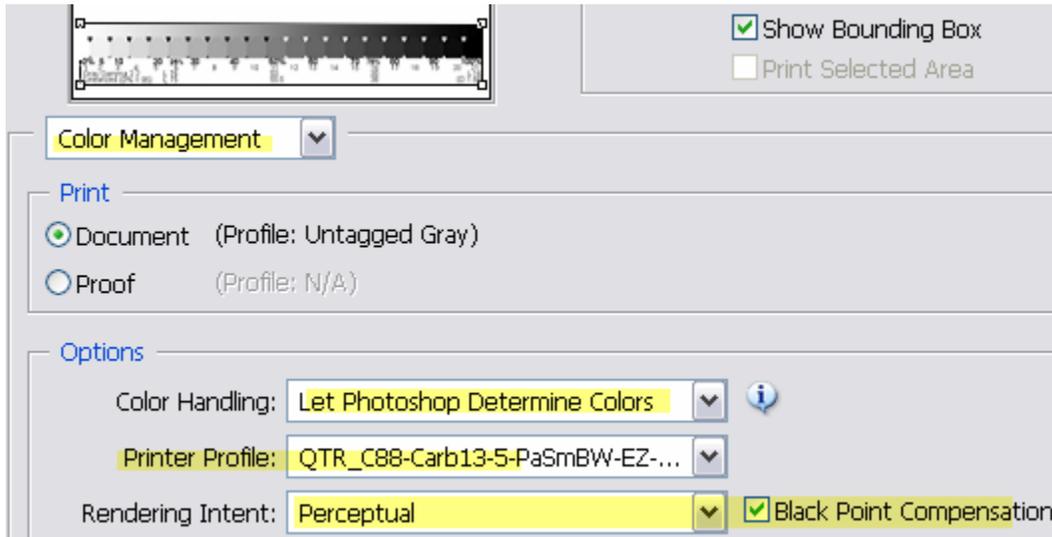
Mac OS X -- User Library/ColorSync/Profiles

Windows 98/M --: \Windows\System\Color

Windows NT/2000 or XP upgrade from NT/2000 --

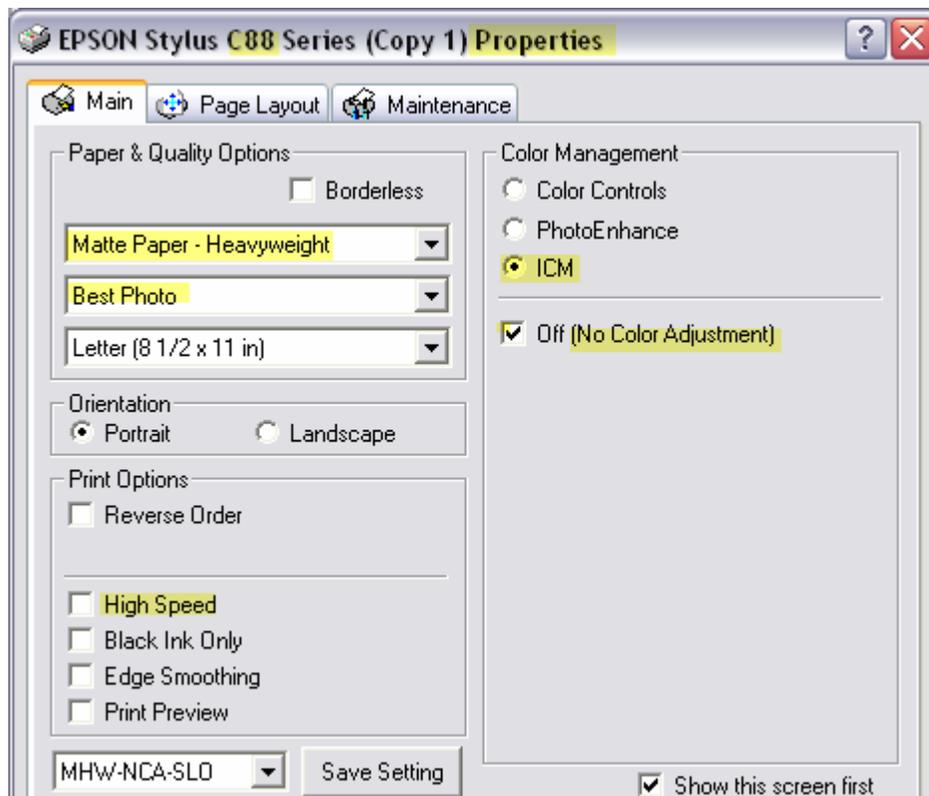
 \Winnt\system32\spool\drivers\color

When printing, the ICCs are loaded in the Photoshop or Elements **Print Preview**. See the screen grab below for the settings.



If you do not have Photoshop or Elements, the curves that optimize the dmax can be used by themselves. These are in the profile download Zip file, as well as information in the Read-Me file that indicates what curve to use.

The **Epson driver settings** are as follows:



If no ICC is used, one can determine the best dmax and make an appropriate adjustment curve similar to what is in the download. See <http://www.paulroark.com/BW-Info/Fine%20Tuning%20the%20Dmax.pdf> for more information on how to optimize the dmax. The 90-100% test file used for this is included in the profiles Zip download file, noted above.

While I currently am using re-fillable carts, a CIS/CFS from MIS, SuperJetUSA (eBay) or other provider may be the easiest way to load the inks.

Enjoy.